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Dr. Hartwig gives the period as 473* days. According to Mr. J. A. Parkhurst, the star is equal to the fourteenth magnitude at its minimum.†

Further Observations of the New Star in Perseus made at the Radcliffe Observatory, Oxford.

(*Communicated by Arthur A. Rambaut, M.A., Sc.D., F.R.S., Radcliffe Observer.*)

This paper contains the results of observations upon the brightness and colour of the new star in *Perseus* made at the Radcliffe Observatory since the date of the last meeting of the Society, and is in continuation of the Notes on the same subject already communicated to the Society, and published in the *Monthly Notices* for March, April, May, and June.

The periodical fluctuations in the brightness of the *Nova* which had been observed up to the end of the first week in June appeared to die out about the middle of that month. The last observed maximum ($4^{m}\cdot57$) was on June 8. The next estimation of magnitude was $5^{m}\cdot80$ on June 17, and since that date the observations show a gradual diminution of brightness at the rate of about $0^{m}\cdot01$ per diem, the magnitude on November 1 being 7·1. If the magnitudes be plotted as ordinates with the dates as abscissæ, a straight line drawn through them will lie within $0^{m}\cdot2$ of all observations, and the discrepancies show no trace of periodicity. Small changes of brightness have occasionally been suspected by the observers in the course of a night's observations.

During the months of June and July the star was observed under unfavourable conditions at a small altitude above the northern horizon. In July the image of the *Nova* was frequently noted as being "dull," and "larger" than the other stars, but since then it has generally appeared sharp and stellar.

On August 22 the image of the *Nova* was carefully examined to test whether any trace could be found visually of the aureole which MM. Antoniadi and Flammarion had seen surrounding the photographic image. No indication of such an aureole could be discovered (see Observers' Notes for that date).

A marked change has also taken place in the colour of the star. The redness previously conspicuous at minimum has gradually disappeared, and the star is now for the most part colourless. On June 17 it was described as very red. From August 8 to August 24 it appeared pale yellow with occasionally a red fringe which did not show in the other star images. From August 27 to November 1 it is generally noted as colourless, with,

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* *Vierteljahrsschrift der Astron. Gesell.*, Jahr. 34, p. 315.

† *Astrophysical Journal*, vol. xiv, p. 172.

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on one or two occasions, an indication of blue. Since July 3 the star *Arg. Z.* +43°, 730 (No. 58 in Table I.) has appeared considerably redder than the *Nova.*

The stars *Arg. Z.* +44°, 734 and *Arg. Z.* +43°, 730 (Nos. 54 and 58 in Table I.) have been frequently used as comparison stars. If the magnitudes given in the Harvard Photometry, Harvard Photometric Revis., and Harvard Photometric D.M., be accepted, it is found that the magnitude of the *Nova* resulting from a comparison with these stars differs systematically from that deduced by comparison with the other stars. Comparing the magnitudes of these two stars with a number of others the resulting magnitudes on the Harvard scale were found to be 6·23 and 6·57 respectively. The magnitudes given for No. 54 in the H.P., H.P, Revis., and H.P. D.M. are 6·04, 6·32, and 6·45. The magnitude given for No. 58 in the H.P. D.M. is 6·91. It will be seen that the Radcliffe estimation of No. 54 on the Harvard scale agrees more closely with the mean of the three photometric results (6·27) than with the first of them, the magnitude hitherto adopted.

These revised magnitudes have been used in Table I. and throughout the comparisons given in this paper.

The following instruments were employed as indicated in the fourth column of Table II. :—

Instruments Used.

Barclay	10-inch equatorial	Power 90
	2·7-inch finder	„ 13
Heliometer	7·5-inch	„ 45
	1·8-inch finder	„ 19
Ramsden	2·2-inch	„ 40
Naked eye.		

Table I.

List of Stars used for Comparison with Nova Persei.

Ref. No.	Name of Star.	Harvard Photom. Mag.	Ref. No.	Name of Star.	Harvard Photom. Mag.
50	*l* Persei	4·84	61	Arg. Z. + 41°, 631	6·00†
51	31 Persei	4·99	62	Arg. Z. + 41, 638	6·16†
52	30 Persei	5·37	63	Arg. Z. + 42, 736	7·00§
53	36 Persei	5·40	64	Arg. Z. + 43, 720	7·25§
54	Arg. Z. + 44°, 734	6·23*	65	Arg. Z. + 43, 732	7·25†
55	Arg. Z. + 44, 648	6·47‡	66	Arg. Z. + 47, 847	5·52†
56	Arg. Z. + 43, 818	5·97	67	Arg. Z. + 44, 714	7·37†
58	Arg. Z. + 43, 730	6·57*	68	Arg. Z. + 47, 844	6·04†
59	Arg. Z. + 42, 795	6·30†	69	Arg. Z. + 47, 846	6·77†
60	Arg. Z. + 44, 656	7·60§	70	Arg Z. + 44, 732	7·32†

* Radcliffe estimations on Harvard scale. † Harvard Photom. D.M.
‡ Harvard Photom. Revision. § Adopted provisionally.

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Table II.

Means of Estimations of Magnitude of Nova Persei.

		G.M.T.		Observer.	Aperture of Telescope.	Reference Stars.	Mean Mag.	Adopted Mag. for the night.
1901.		h	m		inch			
June	17	10	40	R.	7·5	52, 56	5·80	5·80
	18	10	50	R.	7·5	52, 54, 56	5·99	5·99
July	1	11	5	R.	7·5	52	5·90	5·90
	3	11	0	R.	7·5	52, 54	6·00	6·00
	8	11	30	R.	7·5	52	5·97	5·97
	9	11	45	R.	1·8	52, 56, 54, 58	5·91	6·07
		11	45	R.	7·5	52, 54, 58	6·22	
	15	10	30	R.	1·8	54, 52, 56, 58	6·02	6·11
		10	30	R.	7·5	54, 52, 58	6·16	
		11	40	A. A. R.	7·5	58, 54	6·15	
		11	40	A. A. R.	1·8	58, 54	6·15	
	16	10	15	R.	1·8	52, 56, 54	5·86	5·86
	17	11	0	R.	1·8	52, 56, 54, 58	6·22	6·22
	18	11	0	R.	1·8	56, 52, 54	5·99	5·92
		11	20	C.	1·8	56, 52, 54, 58	5·85	
	19	10	30	R.	1·8	52, 56, 54	5·92	5·92
		11	30	R.	2·7	52, 56, 54	5·92	
	20	10	0	R.	1·8	52, 54, 56	5·92	5·92
	22	10	30	R.	1·8	56, 52, 54	5·97	5·97
	23	10	30	R.	1·8	52, 54	5·93	5·93
	24	11	15	R.	1·8	52, 54, 56	6·09	6·09
Aug.	8	11	45	C.	2·7	52, 56, 55, 54	6·34	6·34
	10	10	30	C.	2·7	54, 52, 55, 56	6·45	6·45
	15	9	30	C.	2·7	55, 54, 58, 56	6·50	6·50

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1901.	G.M.T. h	m	Observer.	Aperture of Telescope. inch	Reference Stars.	Mean Mag.	Adopted Mag. for the night.
Aug. 17	10	0	C.	2·7	56, 55, 54, 67	6·51	6·51
20	10	50	R.	Naked eye	54, 59	6·46	6·46
22	9	30	W.	2·7	54	6·13	6·22
	9	30	W.	10·0	54, 53	6·02	
	10	45	R.	Naked eye	54, 59	6·46	
24	10	20	R.	10·0	56, 54	6·30	6·30
27	11	53	R.	2·7	56, 54, 58	6·42	6·42
28	8	45	R.	1·8	58, 54	6·25	6·25
Sept. 3	7	45	R.	7·5	54, 56, 70–54, 58	6·65	6·54
	9	0	R.	Naked eye	54, 59	< 6·30	
	10	45	R.	2·7	56, 58, 54	6·42	
4	7	43	R.	7·5	54, 70	6·77	6·67
	7	43	R.	1·8	56, 70, 54, 58	6·77	
	8	45	R.	1·8	56, 54, 70, 58	6·57	
	9	30	R.	Naked eye	54, 59	6·57	
5	9	7	W.	2·7	58, 62, 61, 55, 54, 68, 69	6·46	6·45
	9	7	W.	10·0	58, 62, 61, 55, 54, 68, 69	6·44	
	10	45	R.	Naked eye	54 59	< 6·30	
7	9	25	R.	2·7	65, 54, 58	6·58	6·58
9	9	40	W.	10·0	58, 64, 65	6·77	6·65
	9	40	W.	2·7	58, 62, 61, 64, 55, 69, 68, 66	6·72	
	10	15	R.	Naked eye	54, 59	6·62	
	11	5	W.	2·2	58, 54, 65	6·42	
10	9	35	R.	2·7	56, 54, 58, 65, 64	6·72	6·72
11	7	40	R.	7·5	70, 54, 56	6·74	6·54
	9	40	W.	2·7	58, 54, 62, 63, 56, 69	6·52	
	9	40	W.	10·0	58, 54, 62, 63	6·43	
14	8	20	W.	2·7	54, 58	6·80	6·65
	8	30	R.	7·5	54, 70, 56	6·74	
	9	30	R.	1·8	54, 56, 58, 65	6·46	

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G.M.T. 1901.		h	m	Observer.	Aperture of Telescope. inch	Reference Stars.	Mean Mag.	Adopted Mag. for the night.
Sept.	18	7	50	R.	7·5	58, 54, 70, 56	6·87	6·79
		8	55	R.	1·8	65, 64, 54, 56, 58	6·71	
	21	9	30	C.	2·7	54, 65, 56	6·73	6·73
	25	8	5	R.	2·7	58, 54, 65, 64, 56, 70, 67	6·72	6·72
	26	8	30	C.	2·7	54, 65, 56, 58	6·75	6 74
		8	53	W.	2·7	58, 65, 54, 62, 63, 55, 60	6·73	
	28	9	0	C.	2·7	65, 54, 58, 64, 56, 55	6·81	6·81
Oct.	4	9	15	R.	2·7	58, 54, 70, 67, 65, 64, 56	6·84	6·84
	5	9	8	C.	2·7	65, 54, 64	6·74	6·74
	9	7	45	R.	2·7	56, 54, 70, 67, 58, 65, 64	6·84	6·84
	18	6	50	R.	2·7	65, 64, 58, 54, 70, 67	6·94	6·94
	19	8	15	C.	2·7	54, 65, 58, 67, 56	6·93	6·93
	21	7	15	R.	10·0	58, 54, 70, 56	6·79	6·79
	22	8	30	C.	2·7	65, 54, 58, 67	6·86	6 86
	24	8	38	C.	2·7	65, 64, 54, 67, 70, 58	7·16	7·16
	25	6	45	R.	2·7	65, 64, 70, 67	7·32	7·15
		6	45	R.	10·0	65, 64, 70	7·39	
		9	0	W.	1·8	58, 54	6·70	
		9	30	R.	1·8	65, 64, 67, 70, 58	7·06	
	30	11	0	R.	2·7	65, 64, 58, 67, 70	7·03	7·03
	31	8	38	C.	2·7	65, 64, 58, 67, 70	7·20	7·20
Nov.	1	7	0	R.	2·7	65, 64, 58	7·12	7·12

Observers' Notes on the Estimations of Magnitude.

1901.
June 17. Nova low, but sky very clear.
July 1. Sky very cloudy.
3. Clouds passing, but estimations fairly reliable.
8. Images varying through shifting fog-banks.
9, 15, 17, 19. In the 7·5-inch the Nova is fainter than No. 58, whilst in the 1·8-inch finder it is much brighter. The image of the Nova is, in the 7·5 inch, duller than that of No. 58, but it is larger. (R.)

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1901.
July 15. No. 58 is brighter than No. 54 in the 7·5-inch, but the two stars are equal in the 1·8-inch. In both telescopes the Nova is brighter than No. 54. (A.A.R.)

18. Comparison with No. 58 difficult owing to close proximity of other stars. Sky hazy. (C.)

19. Image of Nova in the 10-inch is duller than that of No. 58. Sky hazy in places.

23. Sky nearly overcast; observed in breaks.

24. Difficult observations; cloud occasionally passing.

Aug. 10. Sky very clear and definition good.

15. Haze and thin cloud prevalent. Definition not satisfactory.

17. Sky very clear in Perseus. Definition good.

20. Nova just visible to the naked eye, fainter than Nos. 54 and 59. Sky brilliantly clear.

22. To test whether Flammarion's and Antoniadi's photographic aureole could be detected visually, examined Nova with Barclay Equatorial. No difference of image as compared with other stars could be seen with "finder" or 10-inch telescope, using powers 90 or 250. With 250 all images were diffused to-night. (W.) Nova visible to the naked eye by glimpses only. (R.)

24. In the 10-inch No. 58 is distinctly brighter than Nova, but in the 2·7-inch "finder" it is fainter. Sky foggy.

27. Sky clear, but moonlight strong.

Sept. 3. With the 7·5-inch images sharp and good; objects low, observed in twilight. At times the image of the Nova in the 2·7-inch seemed larger than that of No. 54, but its light was duller. With the naked eye Nos. 54 and 59 were seen with but little difficulty, but the Nova was not visible.

4. Observations difficult with the 1·8-inch. The brightness of the Nova seemed to fluctuate in short intervals to the extent of about 0·2 magnitude. With the naked eye the following sequence of magnitude was recorded:—Nos. 50; 53 and 52 nearly equal; 54 and 59 nearly equal; Nova, by glimpses, but suspected only.

5. To the naked eye Nos. 54 and 59 just visible. Nova invisible. (R.)

7. Images varying; clouds passing. Observations difficult.

9. Sky very clear. (W.) No. 54 is easily visible to the naked eye, brighter than No. 59, which is also picked up with but little difficulty. Both stars are distinctly brighter than Nova, which shows up in glimpses only. (R.)

11. Sky hazy. (R.) Thin cloudlets passing at times and occasional large tracts of cloud. Very good images generally. (W.)

14 A hurried comparison. (W.)

18. Image of the Nova sharp and stellar with the 7·5-inch. Some haze passing during observations with the 1·8-inch.

21. Clouds passing. Object-glasses of 10-inch and 2·7-inch "finder" became quickly covered with moisture. Very damp atmosphere.

25. In the 2·7-inch Nos. 54 and 58 are equal in magnitude. In the 10-inch No. 67 is double, but in the 2·7-inch single.

Oct. 5. Hurried estimations owing to prevalence of cloud.

21. Through passing cloud and mist; observations difficult.

22. Haze and thick low fog prevalent.

25. With the 2·7-inch No. 65 is slightly fainter than No. 64; and Nova is considerably fainter than No. 58. With the 10-inch, power 90, No. 65 is fainter than No. 64. Sky hazy in places and moonlight strong. With the 1·8-inch No. 65 is slightly brighter than No. 64. Sky clearer than at $6^h\ 45^m$ G.M.T.; but some haze still prevalent, with moonlight. (R.)

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Observers' Remarks on Colour of Nova and Comparison Stars.

1901.

June 17. Nova very red.

July 1. No marked colour in Nova.

3. Nova is red, but not nearly so red as No. 58.

9. With the 7·5-inch Nova is orange, and No. 58 orange-red.

15. Nova orange-red, but less red than No. 58, in the 7·5-inch. (R.) No. 58 more red than Nova in both telescopes. (A.A.R.)

16, 17. Nova orange; No. 58 orange-red.

18. Nova orange and No. 58 red in the 7·5-inch. (R.) Nova not so red as No. 58 in the 7·5-inch. (C.)

19. In both 7·5-inch and 10-inch Nova orange and No. 58 orange-red.

22. In the 7·5-inch Nova orange-red; No. 58 red.

24. In the 7·5-inch Nova less red than No. 58.

Aug. 8. In the 10-inch Nova pale yellow, much less coloured than No. 58.

10. In the 10-inch Nova much less coloured than No. 58, which is deep orange. At times suspected a reddish fringe to the Nova.

17. In the 10-inch Nova is pale yellow; in strong contrast to No. 58, which is deep orange.

24. Nova orange, not so deep as No. 58. Sky foggy. Moon ruddy, or deep orange.

27. With the 10-inch, power 90: Nova white, with small red wings, and No. 58 orange. Marked contrast in colours with powers 180 and 200. Nova nearly colourless, and No. 58 red-orange. Definition not good with the latter powers to-night.

28. In the 7·5-inch the Nova is colourless and No. 58 orange.

Sept. 3. No colour to Nova in the 7·5-inch, except at intervals, when a merest tinge of red was suspected; No. 70 is reddish; No. 58 rich orange-red.

4. In the 7·5-inch No. 58 orange-red, Nova colourless. In the 1·8-inch Nos. 70 and 58 both orange-red.

5. In the 10-inch No. 62 is yellow-red, No. 61 bluish-white, and No. 55 markedly red-yellow. (W.)

7. No. 58 orange-red in the 2·7-inch.

9. No. 58 is red in the 2·7-inch and No. 55 is a pronounced red. In the 10-inch with power 90 no marked colour to Nova. With power 100 Nova is reddish; also reddish with power 200, but not so marked. No. 58 is strongly red. (W.)

10. In the 10-inch No. 58 is orange-red and Nova colourless.

11. No colour to Nova in 10-inch or 2·7-inch. (W.)

14. Nova colourless in the 7·5-inch and No. 70 orange-red. (R.) In the 10-inch, power 90, the image of the Nova was, at 10^h G.M.T., a bluish-white disc with a narrow reddish fringe. (W.)

18. No. 58 orange-red in the 7·5-inch.

25. In the 10-inch Nova is bluish-white with very small red wings. No. 58 is red-orange. No. 67 is double; the brighter star white, the fainter orange.

26. With the 10-inch and power 90 could not detect any coloured fringe to Nova. (C.) No. 58 yellow in the 2·7-inch. With 10-inch and power 90 Nova is very light yellow, with a faint tinge of red on the border of the image. (W.)

28. In the 10-inch, power 90, Nova is a very pale yellow, with a faint red border showing at times.

Oct. 4. In the 10-inch, power 90, Nova bluish-white and No. 58 reddish-yellow.

9. In the 10-inch, power 90, Nova white and No. 58 orange.

18. In the 10-inch, power 90, Nova white; No. 58 orange; No. 67 is double, the fainter star reddish.

21. Nos. 58 and 70 are orange-red in the 10-inch.

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1901.
Oct. 24. Nova white and No. 58 deep orange in the 10-inch.
25. No. 64 is light orange and No. 70 orange-red in the 10-inch, power 90. (R.)
31. In the 10-inch, power 90, Nova is white and is ⅓rd mag. fainter than No. 58, which is deep orange.

The observers were:	Dr. Rambaut, indicated by	A.A.R.
	Mr. Wickham, ,,	W.
	Mr. Robinson, ,,	R.
	Mr. McClellan, ,,	C.

Radcliffe Observatory, Oxford:
1901 *November* 7.

Additional Note on the Green Flash. By W. H. Pickering.

(*Communicated by the Secretaries.*)

During a recent sea trip I made some further observations upon the green flash at sunset. I was some five or six miles off the Massachusetts coast, and my assistant, Mr. E. R. Cram, and I were watching the Sun set over the land, which was very low at this place. The horizon was fairly clear, and just as the Sun was on the point of disappearing the last ray turned to both of us a bright green. The effect was not so marked, however, as in the sunset I had previously witnessed off the Cuban coast. The next morning Mr. Cram saw the Sun rise out of the ocean, but no unusual colour was observed.

The effect is so marked at sunset that it is singular that it should not have been more generally noticed heretofore. The explanation it seems to me, however, is simple. The effect, I presume, is subjective, and merely a case of complementary colours, like the well-known experiment of gazing fixedly at a red wafer on a white background, then looking away, and seeing a green one in its place. The fact that my assistant could not see it at sunrise, although entirely prepared to do so, confirms this view.

Harvard Observatory:
1901 *October* 8.